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November 6, 1998

Mr. Peter Stevenson  
U.S. Environmental Protection Agency, Region VIII  
999 18th Street, Suite 500, Mail Code: 8EPR-ER  
Denver, Colorado 80202-2405

ADMINISTRATIVE  
RECORD

**SUBJECT: START, EPA Region VIII, Contract No. 68-W5-0031, TDD No. 9809-0014  
Ambient Air Monitoring During Removal - Vasquez Boulevard and I-70 Site**

Dear Peter:

Attached is a copy of the final Sampling and Analysis Plan for ambient air monitoring during removal operations at the Vasquez Boulevard and I-70 site in the City and County of Denver, Colorado. It should be noted as in our previous conversation that the rental of six Data RAM Aerosol Monitors were procured for this phase of field work. If engineering controls for dust suppression are successful in the elimination of fugitive dust, the more costly Data RAM may be substituted by the Mini RAM, which will provide average concentrations over the entire monitoring period.

This document is submitted for your review and approval. If you have any questions please call me at 303-291-8272.

Very truly yours,

URS OPERATING SERVICES, INC.

Mark Rudolph  
Environmental Scientist

## Attachments

cc: T. F. Staible/UOS  
File/UOS

## SITE FILE DOCUMENT I.D. SLIP

Site File Name Vasquez I-70  
Site I.D. No. \_\_\_\_\_  
File Document In: An Sampling Plan

Is this document part of the administrative record?

Yes ☒ No ☐

Does this document contain confidential information?

Yes ☐ No ☒

Key Words/Comments:

## EPA ACTION BLOCK

- ☒ Approved  
☐ Approved, TDD to follow  
☐ Approved as corrected  
☐ Disapproved  
☐ Review with \_\_\_\_\_  
☐ Original to \_\_\_\_\_  
☐ Copy to \_\_\_\_\_  
☐ Reply envelope enclosed

Date

By

## **1.0 INTRODUCTION**

URS Operating Services, Inc. (UOS) has been tasked by the U.S. Environmental Protection Agency (EPA), Region VIII, under Technical Direction Document #9809-0014, to conduct ambient air monitoring during removal of contaminated soils and photographic documentation (photographing various stages of the removal and landscape of properties) during a residential soil removal at the Vasquez Boulevard/I-70 site in the City and County of Denver, Colorado. The field work is projected to be completed during fall and winter 1998.

The sampling will consist of ambient air monitoring around properties where EPA removes soil.

This Sampling and Analysis Plan (SAP) is designed to guide field operations for ambient air monitoring during the removal of contaminated soils, and to describe the quality assurance/quality control (QA/QC) measures and procedures that will be implemented. This SAP is intended to be used in conjunction with the "Emergency Response Program (ERP) Draft Generic Quality Assurance Project Plan" (QAPP) (URS Operating Services, Inc. (UOS) 1997).

## **2.0 OBJECTIVES**

The objective of this SAP is to ensure that the data generated during this removal are adequate to document that engineering controls used have been effective in reducing the risk for airborne contamination migration.

This ambient air monitoring is being performed to document that removal actions have not distributed additional airborne contamination at residential and public locations at the Vasquez Boulevard/I-70 site where elevated levels of arsenic and/or lead have been documented and will be excavated.

## **3.0 BACKGROUND**

The Colorado Department of Public Health and the Environment (CDPHE) collected 25 soil samples from residential yards in Elyria and Swansea on July 16, 1997 (Colorado Department of Public Health and the Environment (CDPHE) 1998). Samples were collected from residential yards located immediately north of the elevated portion of I-70 in the Swansea and Elyria neighborhoods of Denver, Colorado. More

specifically, the samples were collected from the 4600 and 4700 blocks of Williams Street, Race Street, and Vine Street; the 4600 block of Franklin Street and Baldwin Court; the 4700 block of Fillmore Street and Gaylord Street; and the 4800 block of St. Paul Street. These 25 soil samples indicated levels of arsenic ranging from 12 milligrams per kilogram (mg/kg) to 1,300 mg/kg, cadmium ranging from 1.8 mg/kg to 12 mg/kg, and lead ranging from 61 mg/kg to 660 mg/kg. With the discovery of these concentrations, the CDPHE asked the EPA to undertake the investigation of the extent of potential arsenic and lead present in surrounding soils.

Phase I of field sampling occurred on March 2, 1998, and from April 14 to April 28, 1998. Personnel from the Superfund Technical Assessment and Response Team (START) and Response Engineering and Analytical Contract (REAC) collected a total of 2,363 surface soil samples (0 to 2 inches below ground surface (bgs)), 1,096 depth soil samples (6 to 10 inches bgs), and 91 field replicates, totaling 3,550 soil samples from a total of 1,152 properties in the neighborhoods of Elyria and Swansea in North Denver, Colorado, averaging approximately 3.1 soil samples per property sampled.

These data indicate that arsenic and lead contamination is widespread with little or no pattern to its geographic distribution. A total of 46 properties had arsenic concentrations greater than or equal to 400 mg/kg and/or lead concentrations greater than or equal to 2,000 mg/kg. A total of 248 properties had arsenic concentrations ranging from 70 mg/kg to 399 mg/kg and/or lead concentrations ranging from 500 mg/kg to 1,999 mg/kg. Elevated concentrations of arsenic and lead were detected along the southern boundaries of the primary project area. Since the predominant land use immediately south of 38<sup>th</sup> Avenue is primarily residential, the boundaries for this investigation were expanded to the south to 35<sup>th</sup> Avenue as part of Phase II. Additionally, a small portion of Globeville, located south of I-70 and west of I-25, was also sampled during Phase II, as well as properties (previously unsampled where access was granted) within the original site boundaries.

The objectives of Phase II sampling included the screening of these properties as well as confirming the presence of elevated levels of arsenic and lead detected during Phase I sampling.

Phase II sampling was conducted from July 20 to August 10, 1998. Personnel from START and REAC collected a total of 936 surface soil grab samples (0 to 2 inches bgs), 453 depth soil grab samples (6 to 10 inches bgs for first time samples or 12 to 16 inches bgs for confirmation samples), 117 surface soil

composite samples (5-point composite from 0 to 2 inches bgs), and 79 field replicates, totaling 1,585 soil samples from a total of 372 properties in the neighborhoods of Elyria and Swansea in North Denver, Colorado, averaging approximately 4.3 soil samples per property sampled.

The data from Phase II indicated that arsenic and lead contamination is widespread with little or no pattern to its geographic distribution, as indicated in Phase I sampling. For properties where first time sampling occurred, 9 properties had arsenic concentrations greater than or equal to 400 mg/kg and/or lead concentrations greater than or equal to 2,000 mg/kg. A total of 110 properties had arsenic concentrations ranging from 70 mg/kg to 399 mg/kg and/or lead concentrations ranging from 500 mg/kg to 1,999 mg/kg.

For properties where confirmation sampling occurred (Phase I and Phase II properties with arsenic greater than or equal to 400 mg/kg and/or lead greater than or equal to 2,000 mg/kg), a total of 28 properties had arsenic concentrations, in one or more samples collected, with greater than or equal to 450 mg/kg. Of these 28 properties, a total of 21 properties had arsenic greater than or equal to 450 mg/kg from composite samples of the front yard and/or the backyard. There were no properties within this arsenic/lead concentration range with only lead contamination. A total of 24 properties had arsenic concentrations, in one or more samples collected, ranging from 70 mg/kg to 449 mg/kg and/or lead concentrations ranging from 500 mg/kg to 1,999 mg/kg.

#### **4.0 FIELD OPERATIONS**

Field operations will be conducted as described below, according to START Technical Standard Operating Procedures (TSOPs), the MIE Model Data Real-time Aerosol Monitors (Data RAM) instruction manual, the Mini RAM Personal Monitor Model PDM-3 (Mini RAM) instruction manual, and according to the site specific health and safety plan (UOS 1995; MIE, Inc. 1990; MIE, Inc. 1996).

##### **4.1 SAMPLING DESIGN, LOCATIONS, COLLECTION, AND RATIONALE**

Ambient air monitoring will be conducted during removal of contaminated soils using a combination of Data RAM and Mini RAM. Both air monitors provide data for total suspended particulates (TSP). The Data RAM monitor provides direct and continuous readouts as well as electronic documentation of the monitoring data. Monitoring data recorded by the Data RAM include the

number of logged points, start time and date, total run elapsed time, averaging time, data logging averaging period, calibration factor, Short Term Exposure Limits (STEL) concentration, STEL occurrence time after start, overall average concentration, and overall maximum and minimum concentrations with data point number. The Mini RAM provides direct and continuous readouts as well as overall average concentrations during the monitoring period.

A total of three Data RAM monitors will be stationed along the north, south, and eastern fence lines of the property where removal is going to occur during downslope wind conditions (winds from the west to the east). A Mini RAM will be used to monitor the western boundary during downslope wind conditions. A total of three Data RAM monitors will be stationed along the north, south and western fence lines of the property where removal is going to occur during upslope wind conditions (winds from the east to the west). A Mini RAM will be used to monitor the eastern boundary during upslope wind conditions. Weather patterns will be monitored for any change in upslope or downslope conditions. Additionally, a wind speed and direction monitor (no data logging potential) will be stationed at each residence where a removal is occurring. This will aid in site specific location of Data RAM and Mini RAM units. If wind speeds exceed 30 miles per hour (mph) the EPA On-Scene Coordinator (OSC) will be notified. A STEL alarm of 200 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) will be set on each Data RAM and if this action level is exceeded, the OSC will be notified for an appropriate change in removal work being conducted.

In addition to perimeter fence line air monitoring, a background station will be set up at the equipment staging facility located at 4800 Columbine Street. This station will be equipped with a meteorological station for the monitoring and data logging of area wind speed and direction.

#### 4.2 ANALYTICAL PARAMETERS

Ambient air samples will be monitored for real-time total suspended particulates (TSP) with a detection limit of  $0.1 \mu\text{g}/\text{m}^3$  average every 10 seconds with the MIE Data RAM and a detection limit of  $1.0 \mu\text{g}/\text{m}^3$  average every 10 seconds with the MIE Mini RAM. The MIE Data RAM will collect particulates (after monitoring) on a cassette particulate filter cartridge for definitive laboratory analysis. Cassette particulate filters will be collected for each Data RAM for each property during excavation only. The cassette particulate filters will be analyzed using SW846 method 6010B.

Metals detection limits on the filter cassettes will be based on the National Ambient Air Quality Standard (NAAQS) value for lead ( $1.5 \mu\text{g}/\text{m}^3$ ). Values based on chronic exposure and cancer risks were established by an EPA toxicologist and set as follows: arsenic ( $0.2 \mu\text{g}/\text{m}^3$ ) and cadmium ( $3.0 \mu\text{g}/\text{m}^3$ ) (U.S. Environmental Protection Agency (EPA) 1998). Parameters necessary for the analysis of each filter cassette are available from the downloaded data from each respective Data RAM, and include the following: elapsed run time (start and stop time), and calibrated flow rate.

#### 4.3 STANDARD OPERATING PROCEDURES

Standard Operating Procedures (SOPs), START TSOPs, data collection forms, and a quick reference "Field Sampler's Guide" have been developed for use on the START program for sampling and related data-gathering activities (UOS 1996). The purpose of these procedures is to obtain samples that represent the environment and contamination under investigation. These SOPs and START TSOPs provide consistency in data collection activities and decrease the time needed for plan preparation and review. The following START TSOPs and manufacturer operational guidelines will be used for this investigation:

- START TSOP 4.1 - General Field Operation - describes the overall field organization in support of sample collection, sample identification, record keeping, field measurements, and data collection.
- START TSOP 4.3 - Chain of Custody - outlines the documentation necessary to trace sample possession.
- START TSOP 4.6 - Use and Maintenance of Field Log Books - outlines the proper documentation of information in field log books during data collection activities.
- MIE, Inc. - Mini RAM Personal Monitor Model PDM-3 Operations Manual (MIE, Inc. 1990).
- MIE, Inc. - Data RAM Instruction Manual (MIE, Inc. 1996).

## **5.0 FIELD QUALITY CONTROL REQUIREMENTS**

A total of one duplicate sample for the Data Ram ambient air monitor will be collected to document the precision of sample collection procedures. The duplicate Data RAM will be located at a downwind location and will collect duplicate real time monitoring data for TSP and a duplicate particulate filter cassette for arsenic, cadmium, and lead analysis.

## **6.0 ASSESSMENT AND RESPONSE**

Assessments are utilized to increase the user's understanding of the activity being assessed and to provide a basis for improving that activity. Assessments may be conducted by START staff or independent subcontractors. Quality assurance assessments for this project will consist of independent technical review for all reports and technical edits for all reports. Please refer to the Draft ERP QAPP, Section 12.0, "Assessment and Response," for specific requirements for each type of assessment response (UOS 1997).

## **7.0 RECONCILIATION WITH DATA QUALITY OBJECTIVES**

All data generated for this project will be reconciled with the Data Quality Objectives (DQOs) presented in this SAP. The data will be assessed for accuracy, precision, completeness, representativeness, and comparability. The data assessment criteria for each of these parameters is described in the Draft ERP QAPP, Section 5.2, "Data Assessment Parameters." This section establishes the methods for calculating accuracy, precision, and completeness and for evaluating representativeness and comparability using the methods described by EPA guidance. Generally, data that do not meet the established acceptance criteria are cause for resampling and reanalysis. However, in some cases data that do not meet acceptance criteria are usable with specified limitations. Data that are indicated as usable with limitations will be included in the final report, but are clearly indicated as having limited usability. Indicators of data limitations include data qualifiers, quantitative evaluations, and narrative statements regarding potential bias. Please refer to the Draft ERP QAPP, Section 14.0, "Reconciliation with Data Quality Objectives," for specific requirements for reporting of data usability (UOS 1997).

## **8.0 DELIVERABLES AND PROJECT ORGANIZATION**

Following the completion of all field activities and air monitoring, a removal and monitoring report will be submitted to the EPA. The removal and monitoring report will document all pertinent activities and the results of air monitoring. The report will be provided within 30 days after the completion of the last property scheduled for removal.

The EPA On-Scene Coordinator (OSC), Peter Stevenson, will provide overall direction for this project and will identify monitoring needs, set the monitoring schedule, coordinate community relations with local activist groups, and provide applicable action levels relative to this project.

The UOS Project Manager and Sampling Task Leader, Mark Rudolph, is the primary contact with the EPA OSC. The UOS Project Manager is responsible for project team organization, supervision of all project tasks, monitoring and documenting the quality of all work produced by the project team, determining deviations from the SAP, and assisting with the overall sampling effort. The UOS Field QC Coordinator and Laboratory QC Coordinator, Kent Alexander, is responsible for ensuring field adherence to the SAP, the ERP Generic QAPP, recording any deviations, and is the primary contact with the analytical laboratory, if applicable. Please refer to the ERP Generic QAPP for complete descriptions of personnel responsibilities.



## 9.0 LIST OF REFERENCES

Colorado Department of Public Health and Environment (CDPHE). 1998. XRF and ICP Analytical Data for 25 Soil Samples Collected in the Elyria and Swansea Neighborhoods. Received on January 5, 1998.

MIE, Inc. 1990. Mini RAM Personal Monitor Model PDM-3 Operations Manual. MIE, Inc., 7 Oak Park, Bedford, Massachusetts, 01730.

MIE, Inc. 1996. Data RAM Instruction Manual. MIE, Inc., 7 Oak Park, Bedford, Massachusetts, 01730.

U.S. Environmental Protection Agency (EPA). 1998. Memorandum from Chris Weis to Peter Stevenson regarding recommended air levels for arsenic, cadmium, and lead. October 29, 1998.

URS Operating Services, Inc. (UOS). 1995. START Standard Operating Procedures, Volume 4: Technical Standard Operating Procedures. December 1995.

URS Operating Services, Inc. (UOS). 1996. "Field Sampler's Guide for Sample Collection and Documentation." August 1996.

URS Operating Services, Inc. (UOS). 1997. "Draft Emergency Response Program (ERP) Generic Quality Assurance Project Plan for the Superfund Technical Assessment and Response Team (START), EPA Region VIII." July 31, 1997.